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(19)(CA) APPLICATION FOR CANADIAN PATENT (12)

(54) Infection Control Agents

(72) McCue, Karen - U.S.A. ;

(71) Eastman Kodak Company - U.S.A. ;

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(57) 1 Claim

INFECTION CONTROL AGENTS

Field of the Invention

The present invention relates to infection control agents for use in household and institutional disinfectants, sanitizers, cleaning products, personal care products and hygiene products.

Background of the Invention

A variety of antimicrobial agents have been formulated into compositions that are marketed as disinfectants, sanitizers, cleaning products, personal care products and hygiene products. However, many of these agents are poorly soluble in water.

Thus, it is an object of the present invention to increase the dispersibility of these agents in aqueous media while minimizing or eliminating the need for organic solvents.

Summary of the Invention

The present invention is directed to an infection control composition that comprises an aqueous dispersion of particles of at least one infection control agent wherein said particles have a surface modifier adsorbed on the surface thereof in an amount sufficient to achieve a particle size of less than about 400 nanometers (nm). The compositions of the present invention can contain other conventional ingredients that are used in such compositions.

Detailed Description of the Invention

The compositions of the invention comprise nanoparticles containing infection control agents. The infection control agents can be any of an antimicrobial or other agent such as phenolics, as for example

orthophenylphenol or ortho benzyl para chlorophenol, triclosan, thymol, essential oils, parachlor meta xylenol, pyrithiones, aldehydes, analides, carbanilides and iodonium salts.

The particles of this invention contain a discrete phase of an infection control agent as described above having a surface modifier adsorbed on the surface thereof. Useful surface modifiers are believed to include those which physically adhere to the surface of the halohydantoin but do not chemically bond to the infection control agent.

Suitable surface modifiers can preferably be selected from known organic and inorganic excipients. Such excipients include various polymers, low molecular weight oligomers, natural products and surfactants. Preferred surface modifiers include nonionic and anionic surfactants. Representative examples of excipients include gelatin, casein, lecithin (phosphatides), gum acacia, cholesterol, tragacanth, stearic acid, benzalkonium chloride, calcium stearate, glyceryl monostearate, cetostearl alcohol, cetomacrogol emulsifying wax, sorbitan esters, polyoxyethylene alkyl ethers, e.g., macrogol ethers such as cetomacrogol 1000, polyoxyethylene castor oil derivatives, polyoxyethylene sorbitan fatty acid esters, e.g., the commercially available Tweens, polyethylene glycols, polyoxyethylene stearates, colloidol silicon dioxide, phosphates, sodium dodecylsulfate, carboxymethylcellulose calcium, carboxymethylcellulose sodium, methylcellulose hydroxyethylcellulose, hydroxypropylcellulose, hydroxypropylmethycellulose phthalate, noncrystalline cellulose, magnesium aluminum silicate, triethanolamine, polyvinyl alcohol, and polyvinylpyrrolidone (PVP). Most of these excipients are described in detail in the Handbook of Pharmaceutical Excipients, published jointly

by the American Pharmaceutical Association and The Pharmaceutical Society of Great Britain, the Pharmaceutical Press, 1986, the disclosure of which is hereby incorporated by reference in its entirety. The surface modifiers are commercially available and/or can be prepared by techniques known in the art.

The surface modifier is adsorbed on the surface of the infection control agent in an amount sufficient to maintain an effective average particle size of less than about 400 nm. The surface modifier does not chemically react with the infection control agent or itself. Furthermore, the individually adsorbed molecules of the surface modifier are essentially free of intermolecular crosslinkages.

As used herein, particle size refers to a number average particle size as measured by conventional particle size measuring techniques well known to those skilled in the art, such as sedimentation field flow fractionation, photon correlation spectroscopy, or disk centrifugation. By "an effective average particle size of less than about 400 nm" it is meant that at least 90% of the particles have a weight average particle size of less than about 400 nm when measured by the above-noted techniques. In preferred embodiments of the invention, the effective average particle size is less than about 250 nm. In some embodiments of the invention, an effective average particle size of less than about 100 nm has been achieved. With reference to the effective average particle size, it is preferred that at least 95% and, more preferably, at least 99% of the particles have a particle size less than the effective average, e.g., 400 nm. In particularly preferred embodiments, essentially all of the particles have a size less than 400 nm. In some embodiments, essentially all of the particles have a size less than 250 nm.

The particles of this invention can be prepared by a method comprising the steps of dispersing an infection control agent in a liquid dispersion medium and applying mechanical means in the presence of grinding media to reduce the particle size of the infection control agent to an effective average particle size of less than about 400 nm. The particles can be reduced in size in the presence of a surface modifier. Alternatively, the particles can be contacted with a surface modifier after attrition.

These methods are described in detail in U.S. Patent No. 5,145,684.

The relative amount of infection control agent and surface modifier can vary widely and the optimal amount of the surface modifier can depend, for example, upon the particular infection control agent and surface modifier selected, the critical micelle concentration of the surface modifier if it forms micelles, etc. The surface modifier preferably is present in an amount of about 0.1-10 mg per square meter surface area of the infection control agent. The surface modifier can be present in an amount of 0.1-99.995%, preferably 20-60% by weight based on the total weight of the formulation.

The infection control agent nanoparticles of the present invention can be incorporated into conventional disinfectant, detergent or germicide compositions, as for example those disclosed in U.S. Patent Nos. 3,824,190 and 3,944,498, the disclosures of which is incorporated herein.

The compositions of the present invention can be illustrated by the following representative example.

Example 1

Disinfectant Cleaner Concentrate

	Wt. %
Soap/Surfactant	4.5
Nanoparticle Antimicrobial (Phenolic)	7.8
Solvent	10.0
Builders	0.5
Fragrances	0.2
Dye	0.001
Water	76 - 78

The foregoing specification, including the specific embodiments and example is intended to be illustrative of the present invention and is not to be taken as limiting. Numerous other variations and modifications can be effected without departing from the true spirit and scope of the present invention.

We Claim:

1. An infection control composition comprising an aqueous dispersion of particles of at least one infection control agent wherein said particles have a surface modifier adsorbed on the surface thereof in an amount sufficient to achieve a particle size of less than about 400 nanometers (nm), a surfactant, a dye and a fragrance.

ABSTRACT

The present invention is directed to an infection control composition comprising an aqueous dispersion of particles of at least one infection control agent wherein said particles have a surface modifier adsorbed on the surface thereof in an amount sufficient to achieve a particle size of less than about 400 nanometers (nm). The compositions of the present invention can contain other conventional ingredients.